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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,527	04/09/2004	Chung-Gil Yang	8021-214 (SS-19177-US)	1286

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EXAMINER

NGUYEN, HIEU P

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/821,527

Applicant(s)

YANG ET AL.

Examiner

Hieu Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7,9,10 and 17 is/are rejected.
- 7) ☒ Claim(s) 3-6,8 and 11-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 0204 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/24/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 7, 9-10, 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's admitted prior art (Botti et al., US 6489840).

Regarding claim 1 and 9, Fig. 6 of Botti discloses a method as well as a structure of class-D power amplifier (similar to Fig. 1 of Applicant) comprising:
a summing circuit (summing node), which outputs an error signal by summing an input signal (c) with one of a first negative feedback signal (RF1) and a second negative feedback signal (RF); an integral control circuit (01), which outputs an integral signal by integrating the error signal; a feedback control circuit (6), which generates and outputs a switching control signal whose logic state changes according to the logic state of an abnormal state detecting signal generated in response to a monitoring signal (En); a switching circuit (S), which switches the integral signal to one of a sub-loop and a steady-state loop in response to the switching control signal;
a sub-negative feedback circuit (RF1), which receives and processes the integral signal and generates and outputs a sub-negative feedback signal as the first negative

feedback signal; a controlled circuit (20), which receives and modulates the integral signal into a pulse width modulation (PWM) signal and generates an output signal; and a steady-state negative feedback circuit (RF), which receives and processes the output signal from the controlled circuit and generates and outputs a steady state negative feedback signal as the second negative feedback signal.

Regarding claim 7, Botti discloses everything claimed as applied to claim 1. In addition, Botti [col. 1, lines 32-42] further discloses the class-D power amplifier, wherein the PWM signal maintains a pulse width that is half (duty-cycle of 50% in absence of input audio signal) the pulse width of the PWM signal in a steady-state when the input signal is a fog signal, after the logic state of the switching control signal changes according to switching the integral signal from the sub-loop to the steady-state loop.

Regarding claim 10, Botti discloses everything claimed as applied to claim 9. In addition, Botti discloses a method of a class-D amplifier, wherein step of "receiving and modulating the integral signal into a pulse width modulation (PWM) signal and outputting an output signal" comprises: modulating the integral signal output (see detail of Fig. 6, signal sq) to the steady-state loop into the PWM signal using a sawtooth wave signal and outputting the PWM signal; outputting an amplified signal according to the PWM signal; and outputting the output signal (see Fig. 6, signal Vout) generated by performing low-pass filtering (Fig. 6, filter: 3) on the amplified signal.

Regarding claim 17, Fig. 6 of Botti discloses a class-D amplifier for generating an unsaturated integral signal, comprising: a switching circuit (S) for receiving an integral signal and outputting the integral signal to one of a sub-loop (RF1) and a steady-state loop (RF); a sub-loop for receiving the integral signal and generating and outputting a first negative feedback signal; a controlled circuit (6) for receiving the integral signal, modulating the integral signal into an output signal, amplifying the output signal, filtering the output signal, and outputting the output signal; and a steady-state loop for receiving the output signal (Vo) outputting a second negative feedback signal; and generating and outputting a second negative feedback signal; wherein the integral signal is unsaturated due to the first and second negative feedback signals.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Botti in view of Danz et al. (US 5805020).

Regarding claim 2, Botti discloses everything claimed as applied above. In addition, Botti [col2, lines 49-65] discloses a class-D power amplifier, wherein the controlled circuit comprises a PWM modulation chain that is not shown in Figures. Botti doesn't disclose in detail the PWM modulation chain. However, Danz [col. 1, lines 22-

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27] discloses that a class D amplifier requires a modulator, switching circuit and an output filter.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to analyze "the PWM modulation chain" as a class D amplifier comprises a PWM circuit, which modulates the integral signal output to the steady-state loop into the PWM signal using a sawtooth wave signal and outputs a PWM signal; a switching amplification circuit, which outputs an amplified signal using switching according to the PWM signal; and a low-pass filter (LPF) circuit, which receives the amplified signal and outputs a low-pass filtered signal generated by performing low-pass filtering on the amplified Signal.

Conclusion

Allowable Subject Matter

Claims 3-6, 8, 11-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

subject matter:

Regarding claim 3-6, the prior art of record fails to disclose or suggest a structure of a class-D power amplifier, wherein the feedback control circuit comprises: a "slope detector" in combination with the rest of the limitations of the claim(s).

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Regarding claim 8, the prior art of record fails to disclose or suggest the class-D amplifier, wherein "the pulse width of the PWM signal is the same pulse width as the pulse width of the switching control signal when the integral signal is switched from the sub-loop to the steady-state loop." in combination with the rest of the limitations of the claim(s).

Regarding claim 11-16, the prior art of record fails to disclose or suggest the amplification method of a class-D power amplification comprising: "generating and outputting a signal representing the slope of the sawtooth wave signal" in combination with the rest of the limitations of the claim(s).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hieu Nguyen whose telephone number is 571-272-0218. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on 571-272-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Hieu Nguyen
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Zandra V. Smith
Primary Examiner

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